CLAIMS

1. A hypodermic syringe comprising:
a barrel having an open end and provided with a restrictor in the vicinity of said open end,
a plunger slidable in the barrel for drawing liquid into and discharging liquid from the barrel through said open end, and
an injection needle unit for connection to the barrel, the restrictor having at least one aperture sufficiently small as ordinarily to prevent egress of liquid filling the barrel prior to connection of the injection needle unit to the barrel.

2. A syringe as claimed in Claim 1 in which the needle unit includes an injection needle and a mounting portion for the needle and in which the restrictor is designed to allow passage of the needle mounting portion therethrough.

3. A hypodermic syringe having a barrel for use with a retractable needle assembly comprising a needle and a mounting hub for the needle, the barrel being provided with a restrictor in the vicinity of an open end of the barrel, the restrictor having at least one aperture which is sufficiently small as ordinarily to retain liquid within the barrel and being adapted to allow passage of the needle and mounting hub into the barrel.

4. A syringe as claimed in Claim 3 in which the restrictor is located internally of the barrel at or adjacent an open end of the barrel.

5. A syringe as claimed in Claim 3 in which a single aperture is provided therein, said aperture being sufficiently large to allow passage of the needle and hub therethrough.

6. A syringe as claimed in Claim 3 in which the retractable needle assembly comprises a needle, a mounting hub therefor, a restrainer for holding the hub in a

forward position and a retraction mechanism operable, upon release of the hub from the restrainer, to drive the needle and mounting hub rearwardly from said forward position into the barrel.

7. A syringe as claimed in Claim 5 in which the plunger co-operates directly with the restrainer to effect release of the hub.

8. A syringe as claimed in Claim 5 in which at or near the end of the forward stroke of the plunger, the forward end of the plunger contacts the restrictor so that forward movement of the plunger is transmitted through the restrictor to the restrainer in order to effect release of the hub.

9. A syringe as claimed in Claim 3 in which the restrictor is suitable for use with liquids which have, at a temperature of 20 C, a fluid viscosity in the range of 0.6 to 70 cP and a surface tension in the range of 20 to 100 dynes/cm.

10. A syringe as claimed in Claim 3 in which the barrel is provided with a hollow plunger and the retraction mechanism is operable to drive the needle into the hollow plunger.

11. A syringe as claimed in Claim 3 in which the barrel is provided with a plunger having a forward end which approaches said open end of the barrel during discharge of liquid from the barrel and which has at its forward end a part which closes said forward end but is severable or dislodgeable from said forward end to allow the needle and mounting hub to be driven by the retraction mechanism into the hollow plunger.

12. A syringe as claimed in Claim 3 in which the restrictor is a component separate from the barrel.

13. A syringe as claimed in Claim 3 in which the restrictor is integral with the barrel.

14. A syringe as claimed in Claim 3 in which the restrictor is deformable at least in the region of said aperture to allow passage of the needle and mounting hub therethrough.

15. A syringe as claimed in Claim 3 in which the restrictor has or comprises a sealing formation which co-operates with part of the needle assembly whereby, during an injection stroke of the plunger, discharge of liquid from the needle assembly is confined to the pathway provided by the needle.

16. A syringe as claimed in Claim 3 in which said aperture comprises a single hole provided with one or more inwardly directed projections for enhancing the ability of the restrictor to prevent egress of liquid from the barrel.

17. A syringe as claimed in Claim 16, the projection or projections being capable of flexing.

18. A syringe as claimed in Claim 3 in which said aperture of the restrictor is sized so that the hub and needle can pass therethrough during needle retraction.

19. A syringe as claimed in Claim 3 in which said at least one aperture is of a size which is not sufficient to allow passage of the hub and needle.

20. A syringe as claimed in Claim 3 in which the restrictor includes a portion which can be removed to allow passage of the needle and hub during the needle retraction process.

21. A syringe as claimed in Claim 3 in which the restrictor is capable of being disrupted in such a way that it no longer blocks the needle and hub when needle retraction is required.

22. A syringe as claimed in Claim 3 in which the restrictor comprises an inner portion and an outer portion, the inner portion being severable or otherwise releasable from the outer portion to create an opening sufficiently large to allow passage of the needle and hub during needle retraction.

23. A syringe as claimed in Claim 22 in which the inner and outer portions are demarcated from one another by a zone or line of weakness at which the inner portion is severable from the outer portion during needle retraction.

24. A syringe as claimed in Claim 22 in which the zone or line of weakness may be provided by one or more webs of material interconnecting the two portions.

25. A syringe as claimed in Claim 22 in which the inner and outer portions are interconnected at a moulding interface therebetween such that the inner portion is severed or dislodged from the outer portion as the plunger approaches or reaches completion of its forward stroke.

26. A syringe as claimed in Claim 22 in which the inner portion is provided with said at least one aperture.

27. A syringe as claimed in Claim 22 in which the inner portion is of tubular configuration defining a passageway constituting said aperture.

28. A syringe as claimed in Claim 3 in which the restrictor comprises a disc located within the barrel.

29. A syringe as claimed in Claim 28 in which, when in situ within the barrel, the disc is of generally conical configuration with said aperture at its apex.

30. A syringe as claimed in Claim 28 in which the disc is self-retaining in the barrel once inserted.

31. A syringe as claimed in Claim 3 in which the restrictor comprises an annular flange projecting inwardly of the barrel, the flange defining said aperture.

32. A syringe as claimed in Claim 31 in which the flange is resiliently deflectable radially outwardly.

33. A syringe as claimed in Claim 31 in which the flange is formed integrally with the barrel adjacent its open end.

34. A syringe as claimed in Claim 31 in which the flange acts as a lip seal by co-operation with a component of the needle assembly.

35. A syringe as claimed in Claim 3 in which the restrictor is perforated or reticulated to prevent glugging of the liquid out of the barrel.

36. A syringe as claimed in Claim 3 in which the restrictor presents an array of apertures distributed over the cross-sectional area of the barrel.

37. A syringe as claimed in Claim 3 in which the restrictor is of a frangible or brittle material or rendered frangible or brittle in a defined zone or zones thereof so that, during forward movement of the plunger, the integrity of the restrictor is disrupted to allow passage of the hub/needle assembly during needle retraction.

38. A syringe as claimed in Claim 3 in which the restrictor comprises an inner part and an outer part which are normally coupled together but which are released from one another during or just prior to needle retraction.

39. A syringe as claimed in Claim 38 in which the outer part is restrained against forward movement or only allowed to move forwardly to a limited extent relative to the barrel.

40. A syringe as claimed in Claim 38 in which, after release of the inner part from the outer part, the inner part leaves an opening in the restrictor sufficiently large to allow passage of the needle/hub assembly during needle retraction.

41. A syringe as claimed in Claim 38 in which the inner part is provided with a central passageway for liquid flow into and out of the barrel, the passageway being sufficiently small as ordinarily to retain liquid within the barrel when pressure is not being applied to the plunger to move it forwardly.

42. A syringe as claimed in Claim 38 in which the two parts of the restrictor are coupled together by virtue of one part having been moulded in the presence of the other part.

43. A syringe as claimed in Claim 38 in which the two parts are coupled together via frangible sections of material which can readily break to allow release of the inner part from the outer part when required.

44. A syringe as claimed in Claim 3 in which the arrangement is such that the needle unit is engaged with the barrel through a one-way coupling means formed by interfitting components on the needle unit and the barrel whereby the injection needle once assembled to the barrel cannot be disengaged from the barrel.

45. A barrel for use with a retractable needle assembly comprising a needle and a mounting hub for the needle, the barrel being provided with a restrictor located internally of the barrel at or adjacent an open end of the barrel, the restrictor having at least one aperture which is sufficiently small as ordinarily to retain liquid within the barrel and being adapted to allow passage of the needle and mounting hub into the barrel.